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RUPTURE OF THE EYEBALL IN ITS POSTERIOR HEMISPHERE FROM A BLOW IN THE FACE.

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THE two cases of recent occurrence which I here report, although novel in my personal experience, would not have had publicity beyond the staff of the Presbyterian Eye and Ear Charity Hospital, before whom the diagnosis was made and verified after extirpation of the destroyed eyeballs, had I not found in a recent work on "Injuries of the Eye," by Ferdinand Von Arlt, a recognized authority on such matters, the following passage. I make the quotation from a translation of the German work by Dr. Chas. S. Turnbull—an American publication. A paragraph on page 37, reads as follows: "*Cases of rupture of the sclerotic are not rare. Such rents extend without exception to the ciliary body, even through it. Of ruptures in the posterior sclerotic area, only one case is recorded* (by Bowman), *and here the rupture was not recognized until after the eyeball had been enucleated.*" From the same work I make extracts from pages 22 and 23: "When a foreign body impinges against the eye with a certain degree of sudden force, and, on account of certain physical properties, such as size, bluntness, etc., can not perforate its tunics, it expends this force by contusing the surface against which it strikes, or it causes either flattenings or indentations, the degree or extent of which depend on the character of the injuring surface, while, in the moment of injury, perhaps, no movement of the eyeball, as a whole, takes place. Now, an indentation or a flattening of the eyeball can not plausibly

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be considered possible, unless the same also changes its form *in toto.* Suppose we consider the point attacked as the pole, and the direction of the attacking force as the axis of a sphere, then the equator of the latter must become longer at the moment of the injury. Any resistance at the opposite wall, especially if distributed over an extensive area, will only serve to increase this change of form. The occurrence of a gap in such a wall, or of a projection upon it, will, when the globe is pressed against, produce a localized bulging—in the former case corresponding in shape and dimensions to the gap, and in the latter to an indentation or perforation of the sclerotic ; *but such conditions hardly, if ever, occur.*"

"Sclerotic rupture is of *rare or non-occurrence* in those very localities where choroidal rents are most frequent." Again, from page 27: "The constant parallelism of the sclerotic rent to the corneal margin has an additional reason in the histological fact, that the fibres of the sclerotic coat run parallel to the latter within the confines of the ciliary region." Again, at page 38 : "The sclerotic rent is linear, or slightly arched, more or less serrated, and usually runs parallel to the limbus cornea, at a distance of from 2 to 5 millimetres from the latter. In one case only (Schroeter, *Klinische Monatsblätter*, 1866, p. 248) did the rent run at an acute angle."

The following extract is made from a standard work on "Eye Injuries," by George Lawson, F.R.C.S.: "The split in the sclerotic is almost invariably near the margin of the cornea."

Case i.—N. L., aged 27, was struck in the left eye with a chair during a drunken broil. He was knocked down insensible, and had his nose and brow badly cut. When he came to himself he was taken home. In the meantime the eyeball had become very prominent from swelling. He complained of great pain in it, and also of loss of sight. He was brought to the Presbyterian Eye and Ear Charity Hospital for treatment on the day after the accident. I found the eyeball very protruding, with lids much swollen and firmly stretched over the projecting ball which was half exposed. The conjunctiva was much discolored with blood extravasation, and was chemosed in a heavy fold parallel with the free border of the lower lid. When the lids were drawn apart the eyeball protruded so conspicuously as to show the whole anterior half of the sphere, and presented the condition known as paraphymosis of the eyelids. When thus exposed, the whole front of the eyeball was entire, apparently without any injury to its outer walls. The anterior chamber was full of blood, and there was no perception of light. I was induced to palpate the eye and found its tension decidedly minus. It was so soft that the cornea could be corrugated, a condition that could not exist in connection with the intra-ocular hemorrhage without a giving way of the eyeball and the escape of some of its contents. Upon this diminished tension and excessive blood extravasation, with great prominence of the eyeball, I diagnosed laceration of the posterior hemisphere of the sclerotic. To prevent future suffering, I advised enucleation, which operation was satisfactorily effected under chloroform. After making the conjunctival section around the cornea, the opening of the capsule of Tenon to reach the tendon of the external rectus muscle allowed the escape of a quantity of dark fluid blood and indicated the location of the scleral opening, which an examination of the eyeball after its removal confirmed. The rent, which was a large flap, opening in the outer wall of the sclerotic, was located in the posterior hemisphere of the eyeball between the insertions of the external rectus and the oblique muscles. The source of hemorrhage was choroidal. The blood, after filling the eyeball and displacing the lens and vitreous body, which had escaped through the sclerotic rent, had freely effused itself into the orbital space, and by excessive infiltration had caused the extrusion of the eyeball.

This was the first case that I had ever diagnosed, in the absence of any visible wound, as posterior laceration of the sclerotic coat of the eyeball, and I was surprised at the facility with which the diagnosis could be made. The eyeball, full of blood, with excessive extravasation under the conjunctiva, accompanied by marked minus tension, made the diagnosis very positive of escape of some of the eye contents through a wound concealed from view.

I had been very much surprised on previous occasions at the amount of bleeding which could take place from a sclerochoroidal wound. In one, a case in which the eyeball had been perforated by a fragment of iron over the insertion of the superior rectus muscle, I had much difficulty in checking the profuse bleeding from the wound, which saturated thick compresses. I was therefore quite prepared for the excessive extravasation in this case. The accident just reported, of posterior scleral laceration, was from a blow received through the lid upon the elastic eyeball, resulting in the giving way of the eye-coats at a point nearly opposite to that upon which the blow fell; clearly a case of laceration by counter stroke, and at a point where the eyeball is well supported by muscles as well as by the fatty cushion of the socket.

This accident was the sequel of a christmas frolic. In accordance with the experience of every surgeon who finds rare cases running in company, the day after New Year another case of eye injury nearly similar in its results was brought to the hospital dispensary for treatment.

Case 2.—J. F., aged 23, was wounded in the right eye under the following peculiar circumstances. He and a friend were discharging pistols at a mark. While the patient was loading his revolver his companion, standing near him, fired at a stone lying on the ground some ten feet in front of them. With the report of the pistol the injured man cried out that he had been shot, which remark caused much merriment, from the apparent impossibility of such an accident, as the shot had been fired away from him. Blood was seen, however, upon his face, oozing from a wound in the upper lid. The eye immediately commenced to swell. He complained of great pain, and said that his sight was knocked out. I saw him the day after the accident. The eyeball was very prominent with excessive ecchymosis of the conjunctiva, and with the anterior chamber full of blood. The pistol-ball in rebounding backward from the stone had struck the lid, but not with force enough to penetrate. The skin of the upper lid only was broken, and from it the blood had escaped. The eyelids were much stretched over the protruding eyeball, and a fold of discolored, chemosed conjunctival tissue seemed to fill up the palpebral cleft. I elevated the lid upon a retractor and found that there was no wound in the front of the eyeball, and yet upon palpation I found the tension very much diminished, so that I could corrugate the cornea. With the case of a week before fresh in memory, I did not hesitate to make the diagnosis of posterior rupture of the sclerotic coat of the eyeball, and recommended immediate extirpation of the destroyed and painful organ, as the quickest means of obtaining relief from suffering, and safety for the other eye. Under chloroform the eye was enucleated. The eye-shell was found full of coagulated blood. Its normal contents had escaped through a large rent in the upper part of the ball, which opening extended backward from the insertion of the superior rectus tendon. The tendon of the muscle restricted the laceration to the posterior hemisphere of the eyeball and prevented the wound from being seen when the eye was examined before operation.

The laceration seemed to have started from the point of the eyeball upon which the blow impinged, and had extended directly backward. An explanation for this rare accident may be found in the fact that when the injury was received the wounded man was loading his pistol and was looking down toward his hand. He, therefore, had not only the eyeball well covered by the upper lid, but in the extreme downward movement of the eye a large part of the upper hemisphere was rotated forward and exposed to receive the blow. The pistol-ball must have been somewhat spent, as it only broke the skin of the lid ; but the blow was sufficiently sudden and sharp to indent the eyeball to splitting. and thereby make the rent through which the contents of the eye were projected into the socket and incarcerated within the cone of muscles.

These two cases, while rare accidents, at least as far as the establishing of a diagnosis is concerned, differ in the immediate cause of the rent. In the first case the laceration in the eye-coat was not in a portion of the eyeball brought immediately under the influence of the blow. When the man was struck in the face by the chair, the bruised temple, brow, and nose indicated that the blow was received directly across the eye, upon its front, through the medium of the lids. The common seat of laceration near the corneo-scleral juncture did not yield, although this was nearest to the surface receiving the blow. When the sudden flattening of the eyeball took place the rent occurred near the opposite pole of the eye to the one impinged upon. In the second case the rent started at the point receiving the blow, and extended backward in the direction of the posterior pole and at right angles to the so-called constant circular laceration around the corneal periphery.